

---

# FRBSF WEEKLY LETTER

Number 92-31, September 11, 1992

## Pegging, Floating, and Price Stability: Lessons from Taiwan

In recent years, the role of exchange rate policy in stabilizing prices in small economies has been widely debated, particularly in Latin America, where triple-digit inflation rates are often observed. The main question is whether price stability is more readily achieved by pegging the exchange rate to a major currency or by allowing the exchange rate to float. Many observers argue that pegging to a major currency, like the U.S. dollar, is more consistent with price stability because such a peg enhances domestic macroeconomic discipline. In this view, if a country pegs to the U.S. dollar, it must adopt stable fiscal and monetary policies in order to achieve domestic price stability. Otherwise, the possible loss of domestic purchasing power would encourage a switch to U.S. dollars. This in turn would exert downward pressure on the domestic currency and threaten the stability of the peg.

Others argue that greater exchange rate flexibility may be more consistent with price stability, because such flexibility can insulate a small economy from external shocks. For example, if a small country allows its currency to float, it can offset inflationary pressures originating from abroad by allowing its exchange rate to appreciate. It would enjoy no such flexibility if it pegs to the U.S. dollar.

The choice of exchange rate regime is difficult because the extent to which pegging contributes to macroeconomic discipline, or flexible exchange rates contribute to insulation from external shocks, cannot be determined a priori. On the one hand, the disciplining effects of a currency peg may be small or absent in an already well-managed economy, or in an economy where political pressures make tighter monetary and fiscal policies infeasible. It can also be argued that an economy can achieve macroeconomic discipline without pegging the exchange rate. On the other hand, the degree of insulation afforded by flexible exchange rates depends on whether the float is managed so as to offset the impact of external shocks, as well as

on the nature of external shocks. Most theoretical models suggest that insulation will be greater if external shocks are largely monetary in origin. For these reasons, the relative effects of alternative exchange rate regimes can be determined only through empirical study.

This *Weekly Letter* examines the experience of Taiwan for evidence on how the choice of exchange rate regime affects macroeconomic discipline and the vulnerability of the domestic price to external shocks. Taiwan's experience is of interest because it maintained an adjustable peg to the U.S. dollar for most of the 1970s and then shifted to a managed float in an apparent effort to insulate the domestic economy from external shocks (Skully and Liang 1982). The shift in policy allows us to assess how the change in exchange rate regime affected domestic price stability. Taiwan's experience is also noteworthy because it was very successful in stabilizing domestic prices between the 1970s and the 1980s. It thus serves as a potentially instructive model for other economies that have made little progress in achieving price stability.

### Modeling the economy

To address the issues raised above, a simple vector autoregression (VAR) model of Taiwan was estimated. In a VAR, each variable in the model is regressed on its own lagged values and the lagged values of other variables in the system. The equations in a VAR model can be interpreted as reduced-form specifications that capture the relationships between variables over time while requiring little knowledge about the underlying structure of the economy.

The VAR model consists of five variables. The oil price and three U.S. macroeconomic variables (the U.S. consumer price index (CPI), the U.S. real rate of interest, and the U.S. trade-weighted dollar) represent the external sector, while Taiwan's CPI is used to represent that economy's domestic sector. The VAR model was estimated using quarterly data over two subsamples:

---

# FRBSF

1970:1–1978:4, when Taiwan pegged to the U.S. dollar, and 1979:1–1990:4, when Taiwan largely maintained a managed float against the U.S. dollar (Taiwan switched to a pure float against the U.S. dollar in 1989). For ease of exposition, these two subsamples will be referred to as the 1970s and the 1980s respectively, although they do not coincide exactly with those two decades.

The estimates from the VAR model, in combination with a procedure proposed by Sims (1980), were used to estimate the sizes of the external and domestic shocks affecting Taiwan's price. Sims's procedure allows us to distinguish between external and domestic shocks, but not between the underlying sources of these shocks. For example, shocks to the U.S. price reflect the combined effects of shocks from external monetary or fiscal policies, technology, labor markets, and so forth. Similarly, the domestic shocks identified by the model reflect the combined effects of government policies and domestic private sector behavior in Taiwan.

## Currency pegs and macroeconomic discipline

To determine the effect of pegging the currency on macroeconomic discipline in Taiwan, the size of the domestic shocks identified by the model is compared in the 1970s and the 1980s. If pegging the exchange rate encouraged greater macroeconomic discipline, one would expect the size of domestic shocks to be smaller in the 1970s (as a result of more stable government policies), when Taiwan was pegging to the U.S. dollar, than in the 1980s, after Taiwan switched to a managed float.

Contrary to this expectation, the size of domestic shocks in Taiwan (as measured by the standard deviation of these shocks) fell 64 percent between the 1970s and the 1980s. The decline in domestic shocks in Taiwan is particularly striking because there was an increase in the size of external shocks between the two periods. The standard deviations of shocks to the oil price, the U.S. price level, real interest rate, and trade-weighted dollar increased by 119 percent, 30 percent, 25 percent and 44 percent, respectively. Thus, in the case of Taiwan, there is no evidence that pegging to the U.S. dollar contributed to greater macroeconomic discipline.

## Floating rates and insulation

Proponents of flexible exchange rates emphasize the benefits of insulating the domestic economy

from external shocks. One way of gauging the impact of external shocks on the domestic economy is to compare the magnitude of the response of the price level to these external shocks during the dollar peg and flexible rate periods. If an external shock of a given size has a smaller impact on Taiwan's price level during the flexible rate period, it can be argued that the flexible exchange rate regime provides insulation.

It is difficult to predict whether any given external shock will raise or lower the domestic price. One reason is that each of the external shocks reflects the combined effects of shocks from various sources. The response of Taiwan's price will differ according to which of these effects is dominant. In addition, the response of Taiwan's price level to these various shocks will be influenced by the domestic policy responses to the external shocks.

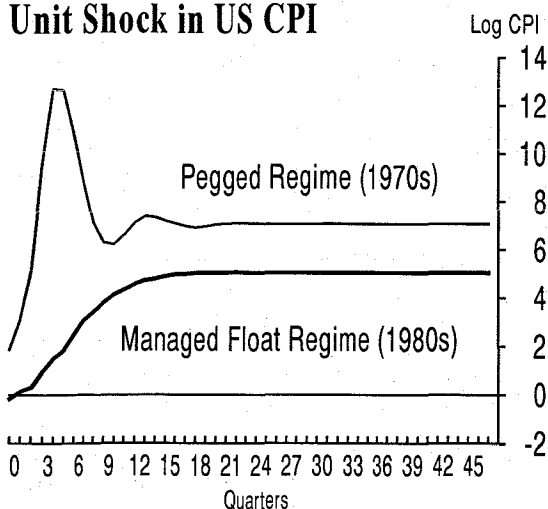
In spite of uncertainty about the *sign* of the expected response to external shocks, it is still possible to ascertain whether the *size* of the responses to these shocks fell when Taiwan switched to a managed float. To illustrate these changes, the responses over time of Taiwan's price level to *unit* shocks to the U.S. price and to the oil price over the two subsamples are plotted in Charts 1 and 2, respectively. In each chart, the vertical axis measures the logarithm of Taiwan's CPI, and the horizontal axis measures time in quarters.

Chart 1 indicates that Taiwan's price level increased in response to a shock to the U.S. price during both the dollar peg and the managed float periods. However, the pattern of the response differs in the two periods. During the dollar peg period, a shock to the U.S. price produced a very large short-run response in Taiwan's price level that was subsequently partly reversed. After Taiwan abandoned its peg to the U.S. dollar, the short-run response to a U.S. price shock was much smaller, and there was no long-run reversal. In spite of these contrasting responses, it is clear that the increase in Taiwan's price level was larger during the dollar peg period at both short and long horizons.

Chart 2 reveals even more striking differences between the two periods by illustrating the responses of Taiwan's price level to oil price shocks. During the dollar peg period, an increase in the oil price produced a very sharp short-run

Chart 1

## Response of Taiwan CPI to Unit Shock in US CPI



increase in Taiwan's price level (with a peak impact at around 5 quarters) that was subsequently reversed. In contrast, during the managed float period, an increase in the oil price was associated with a relatively small *decline* in Taiwan's price level, possibly because Taiwan's exchange rate tended to offset changes in the oil price in this period. As in the case of shocks to the U.S. price, the size of the response of Taiwan's price level to shocks to the oil price declined during the managed float period.

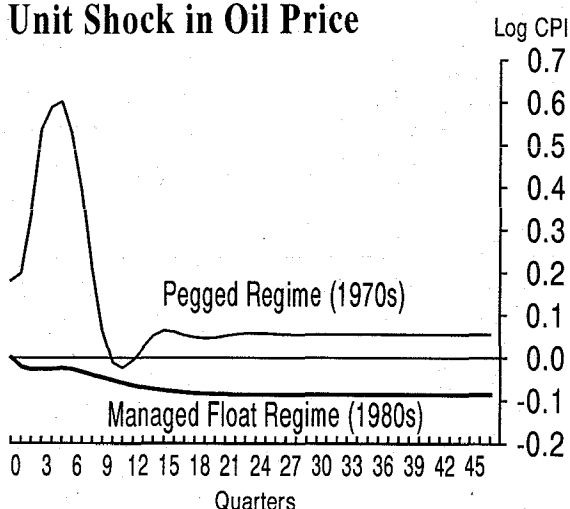
The overall impression conveyed from the charts is unambiguous: External shocks appear to have had a smaller impact on Taiwan's domestic price after it abandoned a dollar peg in favor of a managed float. An analysis of the dynamic responses to shocks to the U.S. trade-weighted dollar and to the U.S. real interest rate in both periods (not shown here) reinforces this impression. These results suggest that more flexible exchange rates contributed to greater insulation from external shocks in Taiwan.

### Conclusions

The experience of Taiwan provides two important insights on the choice of exchange rate regime.

Chart 2

## Response of Taiwan CPI to Unit Shock in Oil Price



First, domestic shocks were larger when Taiwan pegged to the U.S. dollar, so it appears that a currency peg does not necessarily enhance macroeconomic discipline. Second, Taiwan appears to have experienced greater insulation from external shocks after it abandoned its peg to the U.S. dollar, lending support to those who argue that more flexible exchange rates enhance insulation. These two results suggest that an exchange rate peg is not necessarily the best means for achieving price stability.

**Ramon Moreno**  
Economist

### References

- Sims, Christopher A. 1980. "Macroeconomics and Reality." *Econometrica* 48, pp. 1-48.
- Skully, Michael T., and Ching-ing Hou Liang. 1982. *Financial Institutions and Markets in the Far East*. New York: St. Martin's Press.



Research Department  
Federal Reserve  
Bank of  
San Francisco

P.O. Box 7702  
San Francisco, CA 94120

Address Correction Requested

Index to Recent Issues of *FRBSF Weekly Letter*

DATE	NUMBER	TITLE	AUTHOR
2/21	92-08	District Agricultural Outlook	Dean
2/28	92-09	The Product Life Cycle and the Electronic Components Industry	Sherwood-Call
3/6	92-10	Japan's Recessions	Moreno
3/13	92-11	Will the Real "Real GDP" Please Stand Up?	Motley
3/20	92-12	Foreign Direct Investment: Gift Horse or Trojan Horse?	Kim
3/27	92-13	U.S. International Trade and Competitiveness	Glick
4/3	92-14	Utah Bucks the Recession	Cromwell
4/10	92-15	Monetary Announcements: The Bank of Japan and the Fed	Hutchison/Judd
4/17	92-16	Causes and Effects of Consumer Sentiment	Throop
4/24	92-17	California Banks' Problems Continue	Zimmerman
5/1	92-18	Is a Bad Bank Always Bad?	Neuberger
5/8	92-19	An Unprecedented Slowdown?	Trehan
5/15	92-20	Agricultural Production's Share of the Western Economy	Schmidt/Dean
5/22	92-21	Can Paradise Be Affordable?	Cromwell/Schmidt
5/29	92-22	The Silicon Valley Economy	Sherwood-Call
6/5	92-23	EMU and the ECB	Walsh
6/19	92-24	Perspective on California	Sherwood-Call
7/3	92-25	Commercial Aerospace: Risks and Prospects	Cromwell
7/17	92-26	Low Inflation and Central Bank Independence	Parry
7/24	92-27	First Quarter Results: Good News, Bad News	Trenholme/Neuberger
8/7	92-28	Are Big U.S. Banks Big Enough?	Furlong
8/14	92-29	What's Happening to Southern California?	Sherwood-Call
9/4	92-30	Money, Credit, and M2	Judd/Trehan

The *FRBSF Weekly Letter* appears on an abbreviated schedule in June, July, August, and December.